The Hearing Conservation Program: A Refresher for Occupational Medicine Personnel

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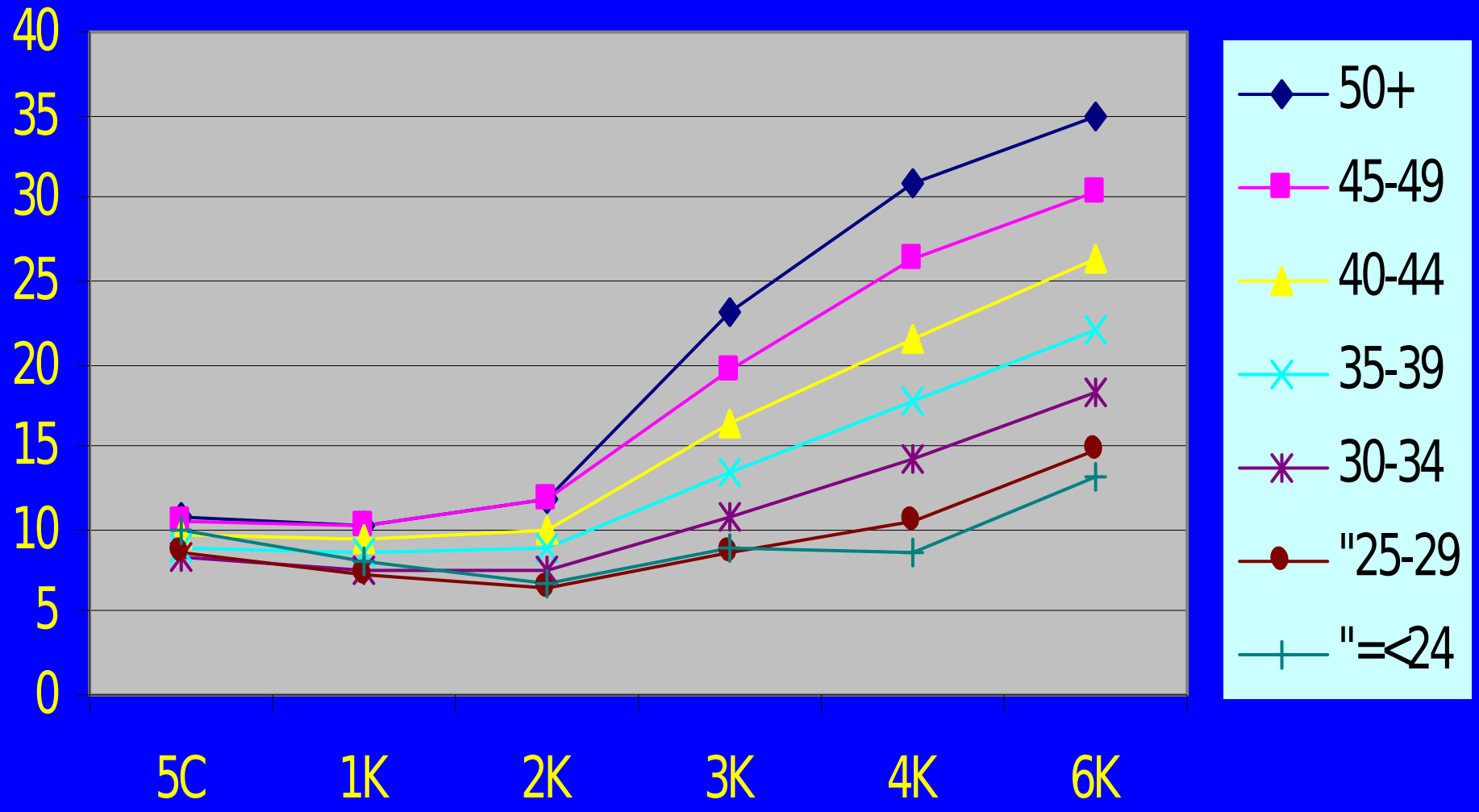
43rd NEHC Workshop
26 March 2004

- Introduction / basic issues
- Audiogram interpretation
- What's New?
  - Hearing Protectors
  - DOEHRS-HC update
  - CFR 1904 (STS and OSHA Recordability)
- Physician/OHN support
- Your turn

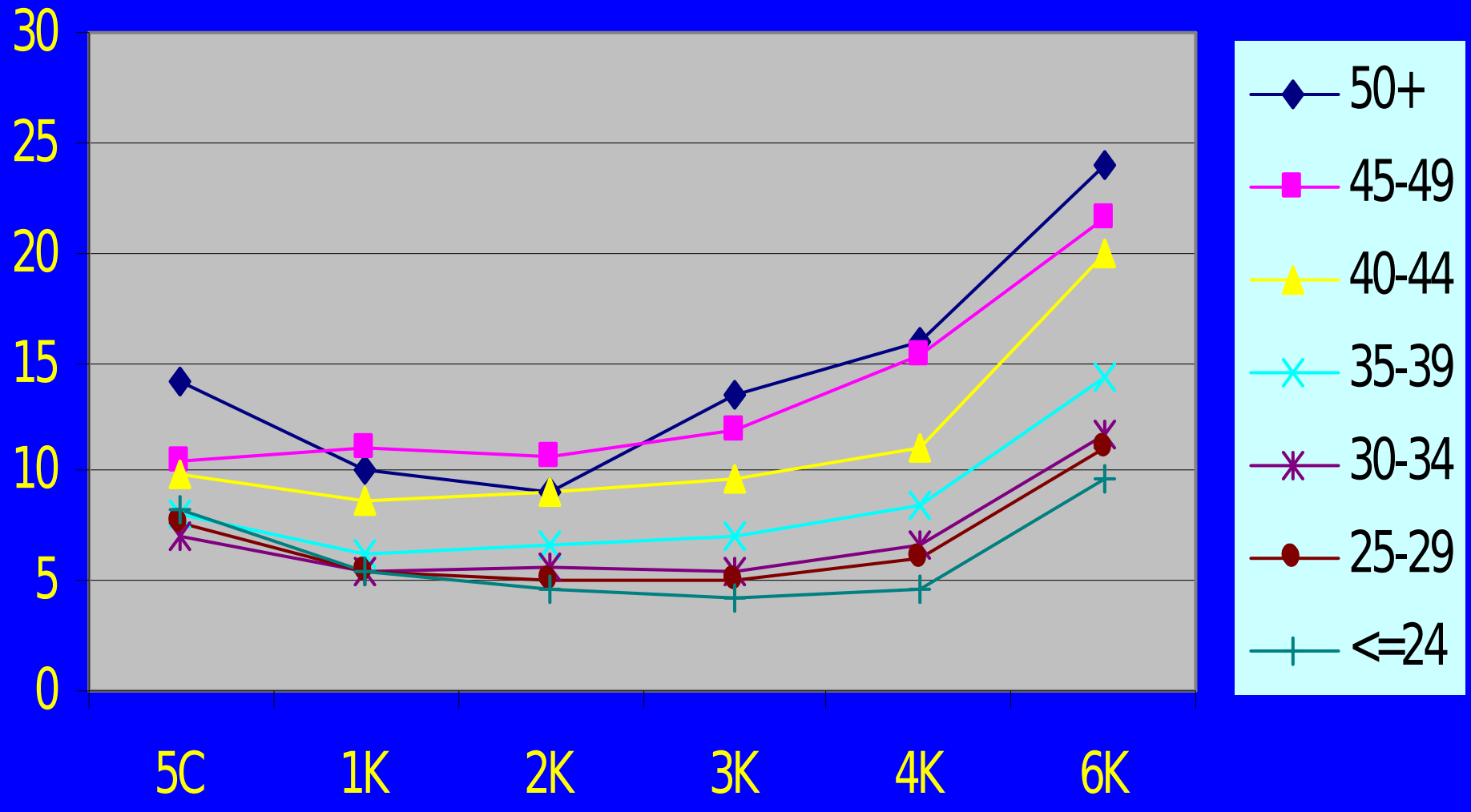
The basics:

- Noise is most prevalent occupational health hazard
- 180K Sailors, 105K USMC, 60K USCS at risk
  - HPDs required above 84dBA, 140dBP
  - Enroll in HCP if “routinely” exposed to TWA >84dBA
    - >2days/mo proposed, OSHA says “NO!”
- Noise Induced Hearing Loss (NIHL) is prevalent in operational and industrial military settings
  - 25% STS rate under DOEHRS-HC
  - STS fairly “level loaded” by occupation, counter-intuitive (Wolgemuth 1995, Page et al, 2002, Rovig pending)

USN Enlisted Male Hearing (AS)

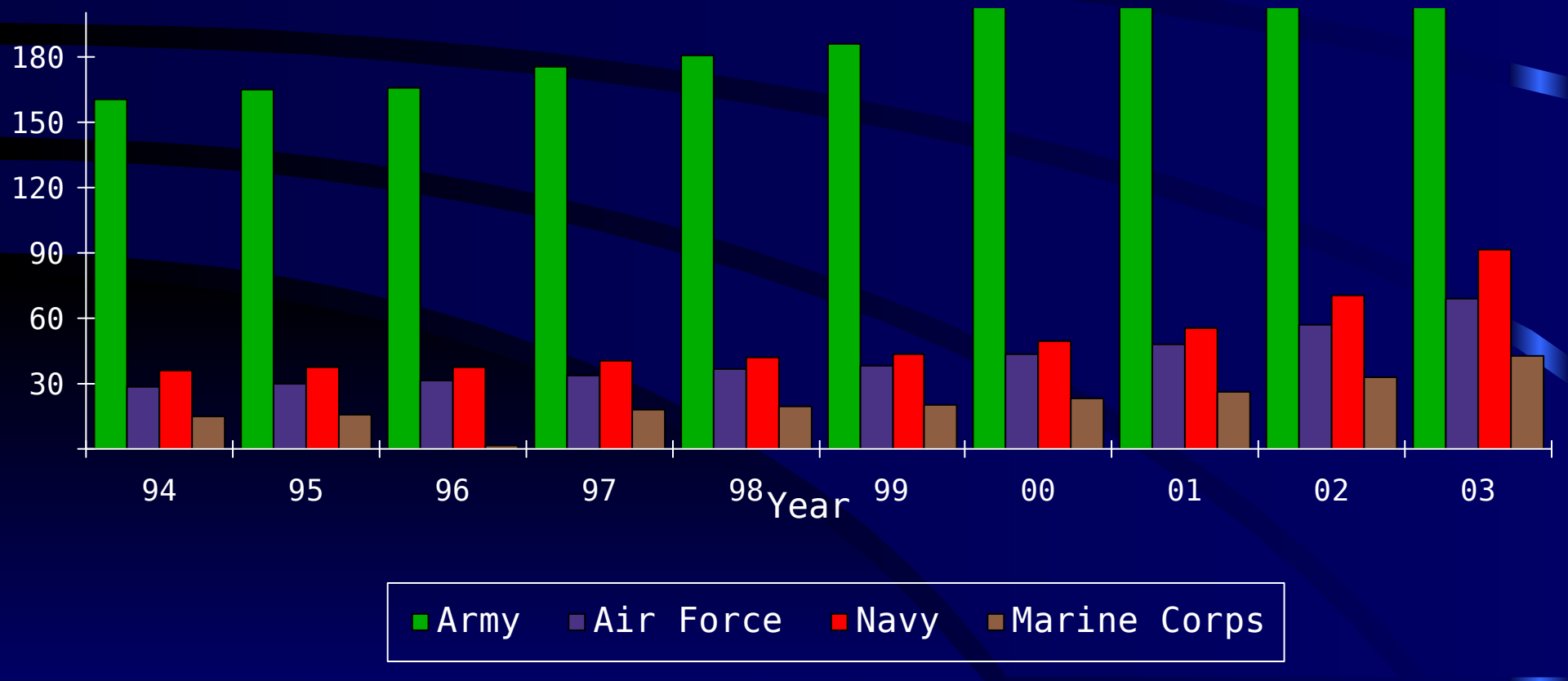


USN Enlisted Women Hearing (AS)



Veterans Hearing Loss Disability Costs 1994-2003

	2003
Army	$337,276,992
Air Force	$ 68,886,576
Navy	$ 91,233,816
Marine Corps	$ 42,456,348



Navy/USMC Civil Service Monitoring Audios

- **25,125** annual audios sampled 1995-1999
- **19%** (4794) demonstrated STS
- **65%** (16,439) abnormal hearing (>20dB @ 1-4K Hz, at least one ear) **Mean age 45-50**
- Age decade (% sample) and % impaired:

<20 (1%)	= 13%	40s (46%)	= 67%
20s (5%)	= 25%	50s (23%)	= 86%
30s (21%)	= 42%	60+ (3%)	= <100%

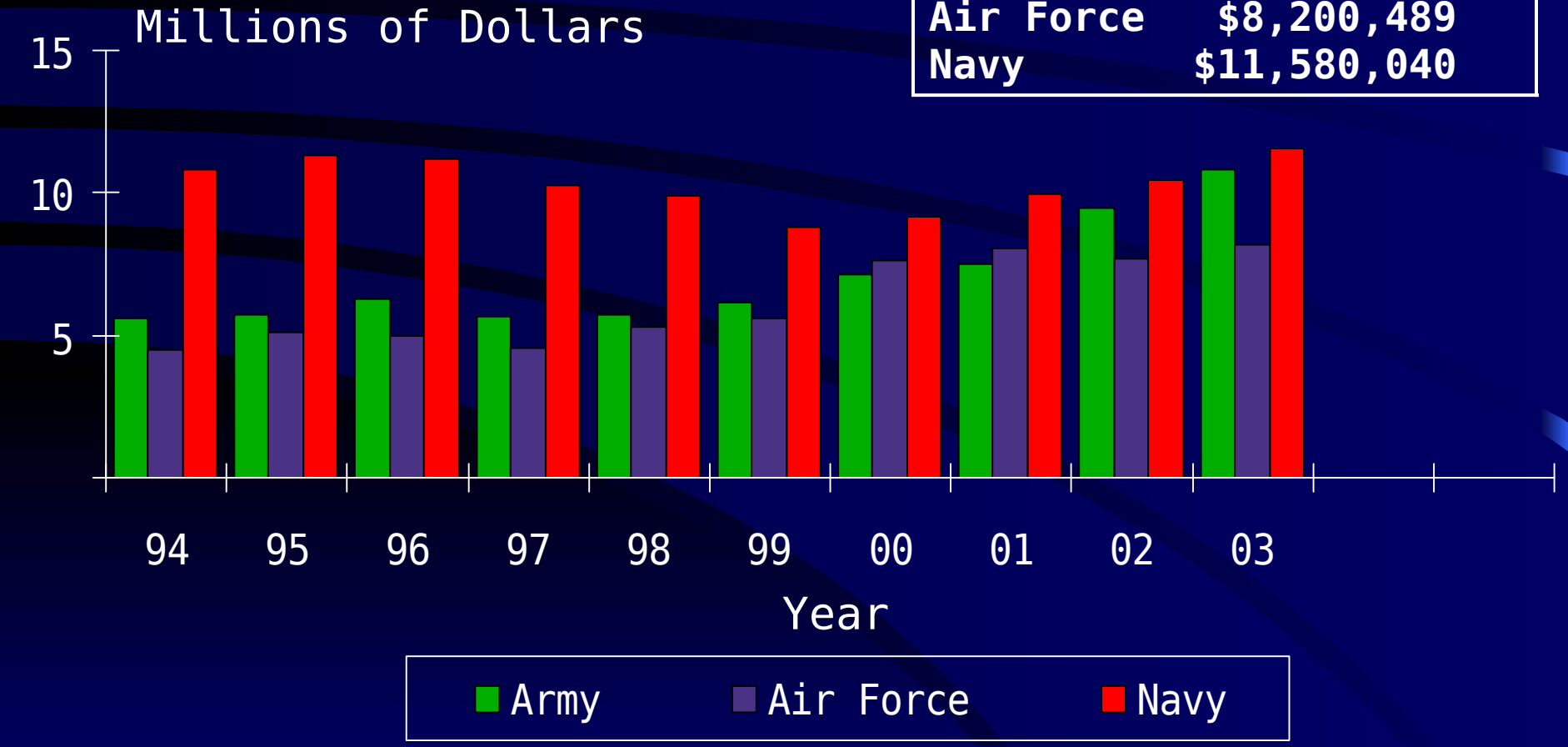
By comparison.....

18% of 205 carrier Sailors abnormal hearing. **Mean age <30 yrs**

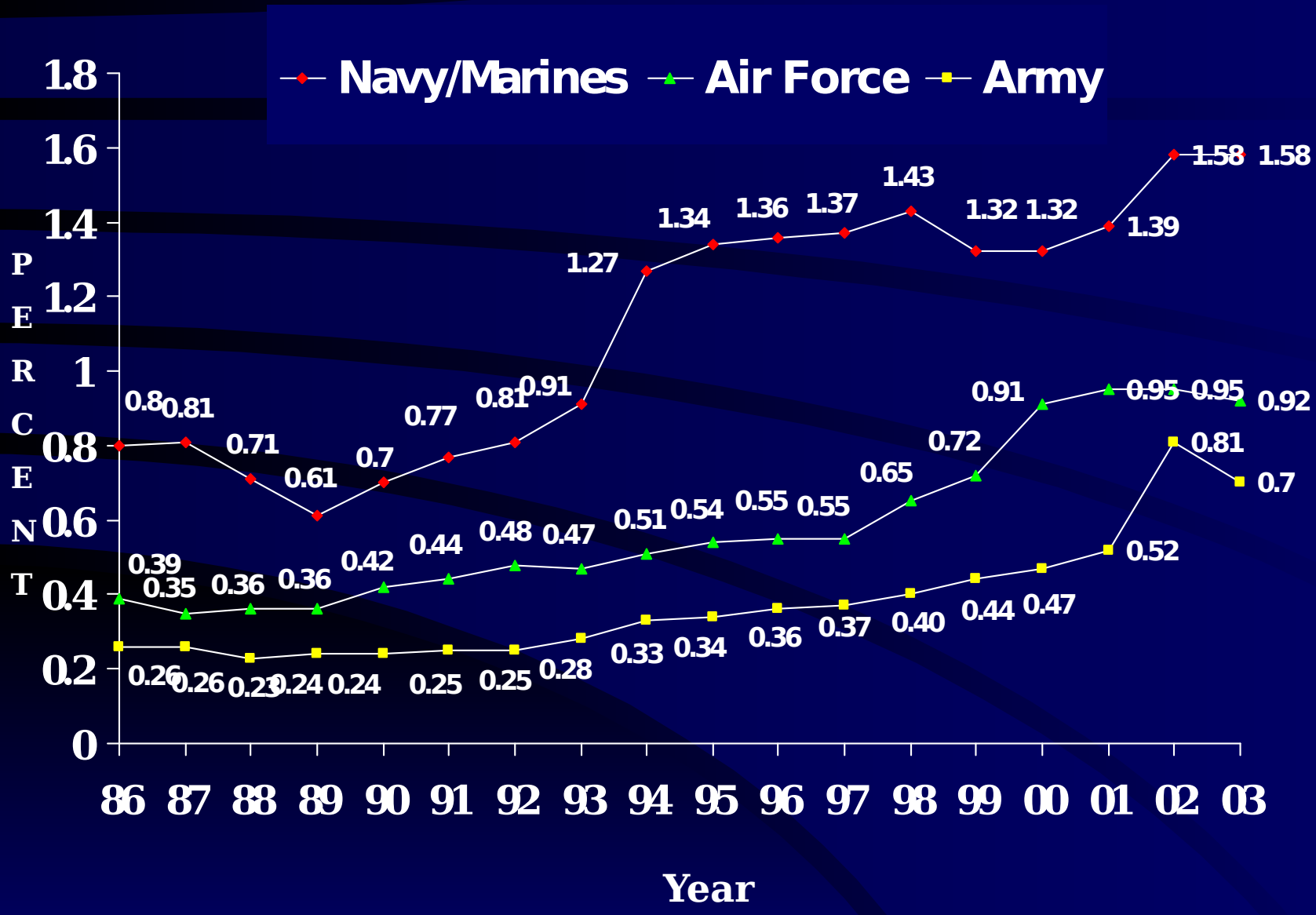
21% had history of permanent threshold shift during military service

Civilian Hearing Loss Compensation Costs 1994-2003

	2003
Army	$10,842,473
Air Force	$8,200,489
Navy	$11,580,040



Incidence of Civilian Hearing Loss Compensation Cases Awarded



Acceptance of
noise starts early….

STUDY OF NIHL AMONG 5,249 CHILDREN AGED 6 TO 19

- 12.5% children age 6-19 showed NIHL at 3, 4, or 6 KHz one or both ears
  - U.S estimate 5.2 million children
  - 8.5% age 6-11 years
  - 15.5% age 12-19

Pediatrics, Vol. 108 No 1, July 2001

“Play it Loud!”

(17,600 Google hits

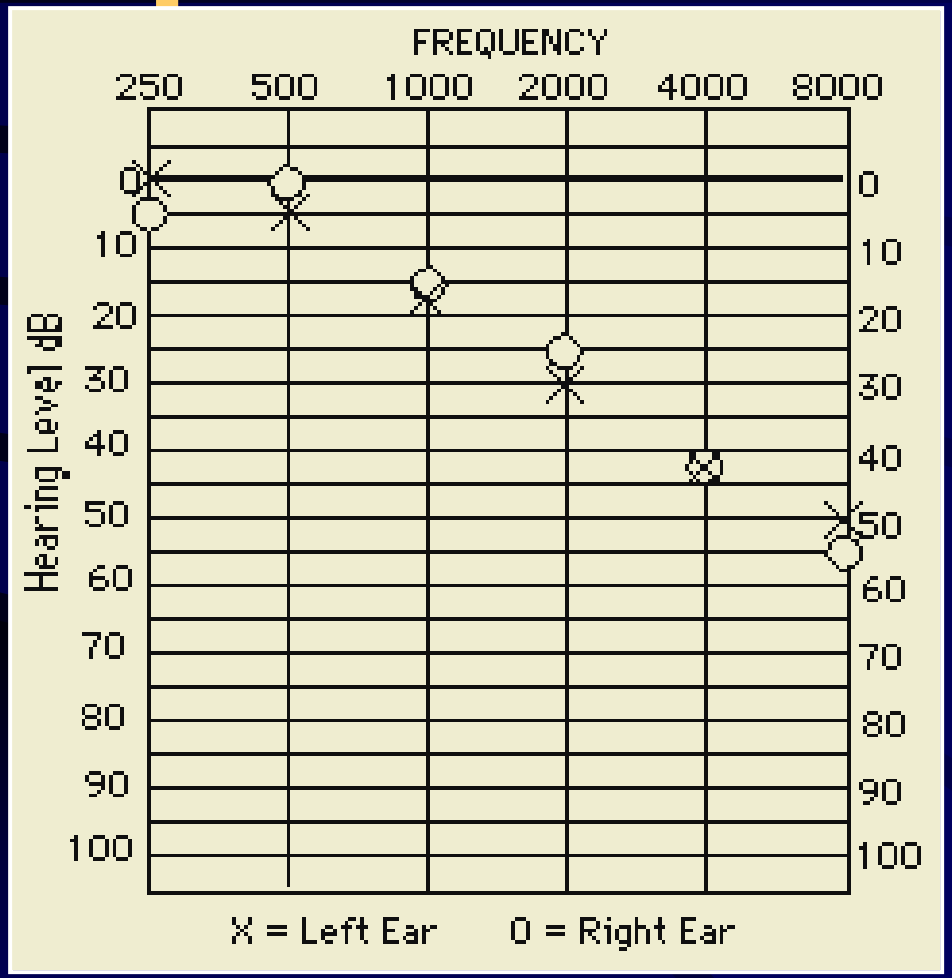
Big Kids’ Toys

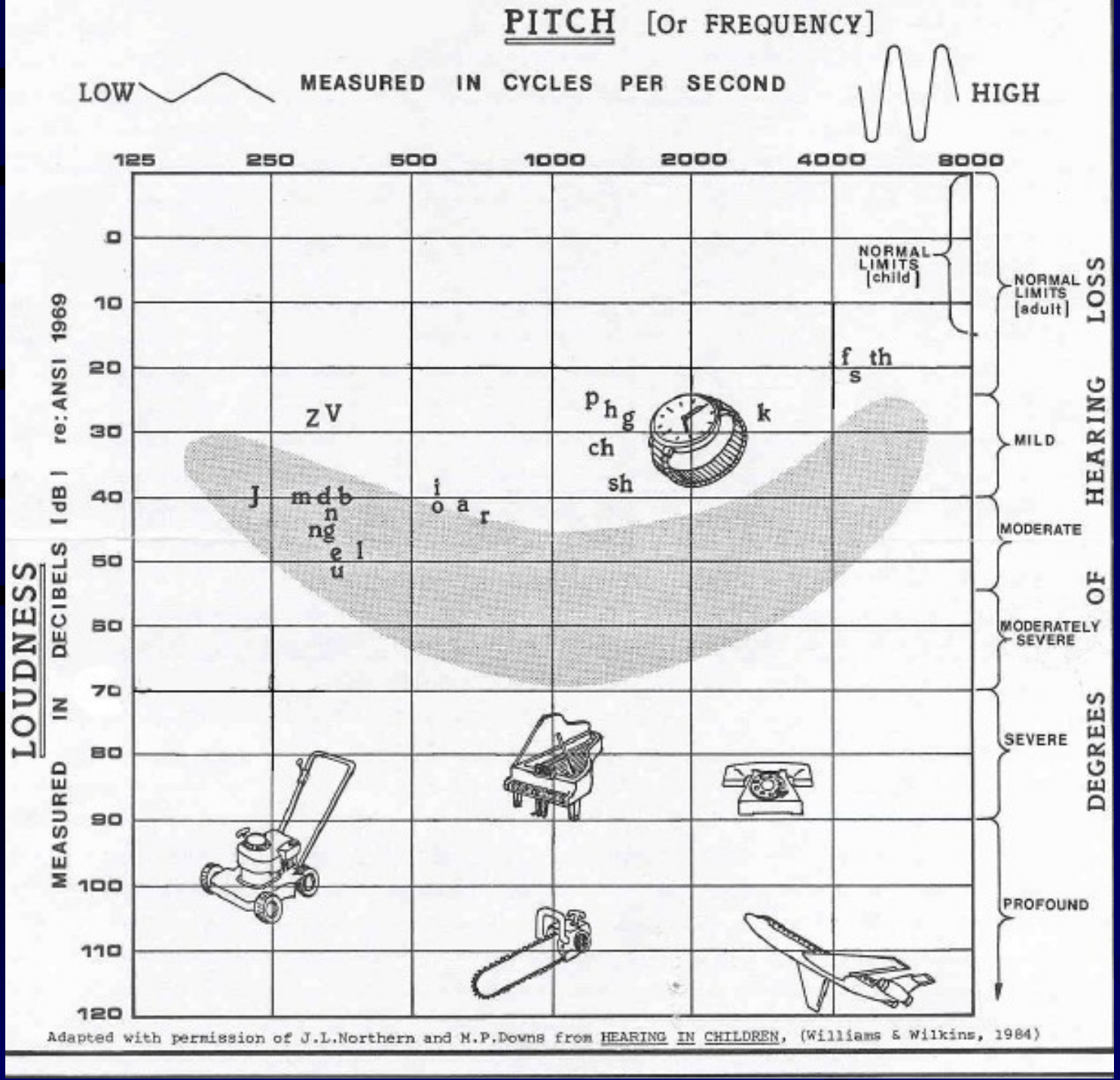
"A lot more people have sound systems. It's getting a lot more mainstream. And so people on the street won't even turn around. You'll be going full blast, and you get nothing. It makes you kind of mad. You're thinking, it's not loud enough?"

Why doesn’t hearing conservation have the same emphasis as sight conservation or ergonomics? Possible answers include:

- No lost work days/low viz
- Not tracked by Safety Center
- VA costs not borne by DoD
- Society accepts, even seeks loudness

Audiogram Interpretation





Adapted with permission of J.L.Northern and M.P.Downs from HEARING IN CHILDREN, (Williams & Wilkins, 1984)

Audiogram Interpretation - 4 Steps

1) Is there a loss? child (0-20dB) vs adult norms (0-25dB)

2) How much of a loss?

- Apply severity scale (communication needs)

- Describe an ear, a freq, a range (e.g. moderate loss above 2KHz)

- AAO traditionally describes “3-freq average”, 500/1000/2000

Audiogram Interpretation

SEVERITY SCALE:

0-25	WNL	Adults function without amplification
26-40	mild	Hearing aid (HA) often useful
41-55	moderate	HA essential, works well
56-70	mod-severe	HA essential, visual augment needed
71-90	severe	HA useful, primarily visual
90+	profound	Visual, consider cochlear implant

3) What kind of loss?

3 Basic types =

- Conductive (mechanical, ear canal to oval window)

- Sensori-neural

- sensori = cochlear (peripheral)

- neural = anywhere from auditory nerve to cortex (central)

- Mixed (example: NIHL plus perforated eardrum)

3a) What could have caused it? Observe:

- Loss configuration

- NIHL = high freq, 3-6K Hz

Other Keys to identifying cause and type:

- Chronology (sudden, gradual, fluctuating)

- Severity (e.g. in child, moderate loss or worse, not just simple SOM)

- Otoscopy

- Tympanometry

- History & complaints

    - Diving? Trauma?

Other Keys to identifying cause for loss:

- **Non-organicity?**

- Unexplained change, flat loss?

- Retiring/separating?

- Pending disciplinary action?

- R/O equipment problems first.

4) What action is required?

- Retest
  - STS on periodic or 1st f-u
  - unreliable results
- Refer medically or to audiologist
  -- Immediate medical for sudden HL with tinnitus and/or dizziness
- For “normals,” revise baseline per audiologist’s written guidelines

Let’s try some case

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/80	5	20	10	15	10	20	20	15	0	5	10	20
2216: 07/02/2001	10	20	25	35	50	60	15	20	10	15	25	25
Carpenter, Age 61	--	+15	+25	+40			+5	+10	+10	+15		

Describe baseline:

Current/Change:

? Causes:

Action:

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/80	5	20	10	15	10	20	20	15	0	5	10	20
2216: 07/02/2001	10	20	25	35	50	60	15	20	10	15	25	25
Carpenter, Age 61	--	+15	+25	+40			+5	+10	+10	+15		

Describe baseline: Essentially WNL AU

Current/change: After 21 yrs, note bilat progressive HFSN, moderate AS and borderline AD, mild communication impairment AS. Asymmetry is an issue

? Causes: Presbyacusis would explain hearing AD.

Shooting? Unlikely, note gradual slope AS

Workplace noise? Why only left? Get history!!

Disease? Maybe. Again, history important (skull fx,

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/89	5	20	10	15	50	35	20	15	10	25	40	20
2216: 08/02/2002	10	20	25	35	65	50	15	20	20	35	55	50
Welder, age 47	--	+15	+20	+10			--	+5	+10	+10	+15	

Describe baseline:

Current/Change:

? Causes:

Action:

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/89	5	20	10	15	50	35	20	15	10	25	40	20
2216: 08/02/2002	10	20	25	35	65	50	15	20	20	35	55	50
Welder, age 47		--	+15	+20	+10			+5	+10	+10	+15	

Describe baseline: Essentially WNL thru 3KHz, bilat mod HFSN. Similar to NIHL

Current/Change: After 13 yrs, note bilat STS, primarily high frequencies. Currently moderately severe HFSN AU. May complain of tinnitus. Good hearing aid candidate.

? Causes: Too young for presbyacusis. Work hx and pattern support noise induced permanent threshold shift from broad-band noise

Action: Audiology referral, fitness for duty eval, HAE. If

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/80	5	20	10	15	10	20	20	15	0	5	10	20
2216: 07/02/2002	55	60	60	70	75	65	50	55	60	60	70	65
(age 45, term, PF)	+40	+50	+55	+65			+40	+50	+55	+60		

Describe baseline:

Current/Change:

? Causes:

Action:

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/80	5	20	10	15	10	20	20	15	0	5	10	20
2216: 07/02/2002	55	60	60	70	75	65	50	55	60	60	70	65
(age 45, term, PE)	+40	+50	+55	+65			+40	+60	+55	+60		

Prescribe baseline: Essentially WNL

Current/Change: Marked STS all freqs AU. Currently moderately severe "flat" loss AU. Complains of ringing in ears, notes hx of daily noise exposure at work. Losing job due to BRAC.

? Causes: First, look at prior years' results. If current results are "new", and no hx of major trauma or illness, 90+% likelihood of malingering.

Action: Audiology referral. Do not make accusations, just note results considered invalid.

One more……

	500	1K	2K	3K	4K	6K	500	1K	2K	3K	4K	6K
Ref: 12/23/90	5	20	10	35	40	35	20	15	0	5	10	20
2216: 07/02/2001	20	20	10	10	20	30	10	20	15	35	45	35
(age 37)			--	--	-25	-20			+5	+15	+30	+35

Describe baseline:

Change/Current:

? Causes:

Action:

What's new? (circa 20(

What’s new today?

What's new in HPDs?

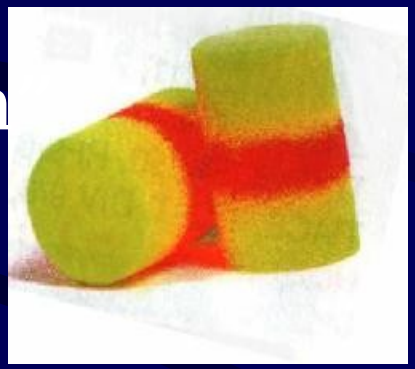
- Single flange "going away"

- Sound Guards are in, EARs are out.

- Sized foamies on GSA (1/3 poor fit w/ "universal")

New Dynamics Sound Guard ®

are **"in**



EAR ® Superfit 3(

and 33

- 4-flanged earplugs (Elvex Qua

What's New in Monitoring Audiometry/DOEHRS-HC?

1) Change in definition of STS

- **Tri-Service decision to use OSHA definition STS only - 2,3,4K ave shift 10dB, no single freq trigger**
- **Retain single freq 15dB as warning, no follow-up**
- **Effect:**
  - **estimate 30-40% reduction STS**
  - **more specific identification of occupational NIHL**
  - **better comparability DoD results with private sector**

What's New in Monitoring Audiometry/DOEHRS-HC?

2) Change in OSHA recordability for civilian workers

- Tri-Service decision (per 29 CFR 1904) to adopt new OSHA format of logging any STS that results in hearing thresholds worse than 25dB high freq ave at 2,3,4K Hz
- Age-correction allowed, <u>not used by DoD</u>
- Effect: simplify process of OSHA logging, although the number of recordables is hard to predict (while STS will decrease, all STS will be recordable once HL exceeds 25dB ave.)

What's New in DOEHRS-HC?

3) New software - v3.1.11 will ship soon

4) Data Repository provides STS by occupation code. Limited ad hoc query also available

5) Much work needs to be done in completing follow-ups, re-defining baselines

- **50-60+% of people with STS do NOT complete follow-up!**
- **STS carries over to next year**

Occupational Medicine Support

Audiologists

- Technical consultant, clinical and training support

OHNs

- Day to day supervision/management
- Enrollment decisions based on job series, location
- Help us get on top of this ‘no-show” situation!

Physicians

- Medically/legally responsible for testing provided

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